

U.S.S.N. 10/031,728

Filed: May 1, 2002

AMENDMENT AND RESPONSE TO OFFICE ACTION

In the Claims

1. (currently amended) A biodegradable polycation composition associated with an anionic macromolecule, said macromolecule being selected from the group consisting of a plasmid, an oligonucleotide, an antisense, a peptide, a protein, an anionic polysaccharide and combinations thereof, comprising:

- a) a natural or synthetic linear polysaccharide chain having an amount of saccharide units ranging from 2 to 2000; and
- b) at least one grafted oligoamine per 5 saccharide units, wherein said oligoamine is selected from the group consisting of a linear, branched and cyclic alkyl amine having at least two amino groups and said oligoamine has a molecular weight of up to ~~2000~~ 1000 daltons.

2. (currently amended) A biodegradable polycation composition according to claim 1, wherein ~~said~~ the natural linear polysaccharide chain is selected from the group consisting of dextrans, pullulan, cellulose, cellobios, inulin, chitosan, alginates and hyaluronic acid wherein the polysaccharide chain contains an amount of saccharide ranging from 2 to 2000 saccharide units.

3. (currently amended) A biodegradable polycation composition according to claim 1, wherein said saccharide units in a synthetic polysaccharide are connected by a bond selected from the group consisting of acetal, hemiacetal, ketal, orthoester, amide, ester, carbonate and carbamate.

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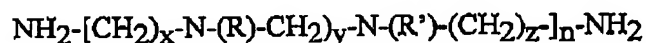
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4. (original) A biodegradable polycation composition according to claim 1, wherein said polysaccharide is a synthetic polysaccharide formed from the condensation of an aldoric acid and a diaminoalkane.

5. (original) A biodegradable polycation composition according to claim 1, wherein said grafted oligoamine is grafted to said polysaccharide chain by a bond selected from the group consisting of an amine bond, an amide bond and a carbamate bond.

6. (currently amended) A biodegradable polycation composition according to claim 1, wherein said oligoamine has the formula:



wherein x, y, z are an integer between 0 and 4 and x+y+z [+] is between 1 and 4 and n is at least 1 when x+y+z=2 or more, or at least 2 when x+y+z=1 and wherein R and R' groups are H or an aliphatic side group of 1 to 6 carbons.

7. (original) A biodegradable polycation composition according to claim 1, wherein said oligoamine is a peptide of up to 20 amino acids with at least 50% of the amino acids are cationic including lysine, ornithine, and diphthamic acid.

8. (currently amended) A biodegradable polycation composition according to claim 1, wherein said oligoamine is selected from the group consisting of spermine and alkyl-substituted spermine, wherein the alkyl substituent contains 1-6 carbons.

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9. (original) A biodegradable polycation composition according to claim 1, wherein said oligoamine is selected from the group consisting of a linear and branched ethyleneimine oligomer having up to 10 ethylene imine units.

10. (original) A biodegradable polycation composition according to claim 1, having an amphiphilic residue wherein said amphiphilic residue is selected from the group consisting of fatty chains, phospholipids, cholesterol derivatives, ethylene glycol oligomers and propylene glycol oligomers.

11. (original) A biodegradable polycation composition according to claim 11, wherein said ethylene and propylene glycol oligomers have a fatty chain block on one side.

12. (original) A biodegradable polycation composition according to claim 11, wherein said amphiphilic residue is connected to said polysaccharide chain by a bond selected from the group consisting of an amine, amide, imine, ester, ether, urea, carbamate and carbonate.

13. (original) A biodegradable polycation composition according to claim 11, wherein said amphiphilic residue facilitates the crossing of the polycation through biological membranes.

14. (original) A biodegradable polycation composition according to claim 1, wherein said polycation composition is not toxic or immunogenic.

15. (currently amended) A biodegradable polycation composition according to claim 1, wherein said composition further comprises a ligand for facilitating the binding of said composition to a ~~predetermined type of~~ cell or tissue.

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16. (original) A biodegradable composition according to claim 1, in combination with cationic and nonionic lipids or polymers for cell transfection.

17. (currently amended) A biodegradable composition according to claim 1, wherein said linear polysaccharide is a dextran and said oligoamine is selected from the group consisting of spermine and ~~derivatives thereof~~ alkyl-substituted spermine, wherein the alkyl substituent contains 1-6 carbons.

18. (original) A pharmaceutical composition, comprising the composition of claim 1, in combination with a pharmaceutically acceptable carrier.

19. (currently amended) A pharmaceutical composition according to claim 17, wherein the pharmaceutically acceptable carrier is ~~an~~ selected from a group consisting of amphiphilic cationic and/or non-ionic lipids ~~and~~ in combination with cationic and non-ionic polymers ~~generally used~~ useful for nucleotide delivery.